

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of Claims:**

1. (Withdrawn) A gene coding a protein involved in carotenoid biosynthesis, which has nucleotide sequences selected from a group consisting of nucleotide sequences represented by SEQ. ID. No 5, No 7, No 9, No 11, No 13 and No 15.
2. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtW* coding  $\beta$ -carotene ketolase and represented by SEQ. ID. No 5.
3. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtZ* coding  $\beta$ -carotene hydroxylase and represented by SEQ. ID. No 7.
4. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtY* coding lycopene cyclase and represented by SEQ. ID. No 9.
5. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtI* coding phytylene desaturase and represented by SEQ. ID. No 11.
6. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtB* coding phytoene synthase and represented by SEQ. ID. No 13.
7. (Withdrawn) The gene as set forth in claim 1, wherein the gene has nucleotide sequences of *crtE* coding geranylgeranyl pyrophosphate synthase and represented by SEQ. ID. No 15.

8. (Withdrawn) A *crt* gene containing all the genes of claim 2 ~ claim 7 and represented by SEQ. ID. No 4.
9. (Withdrawn) A protein encoded by the gene of claim 1, which has nucleotide sequences selected from a group consisting of nucleotide sequences represented by SEQ. ID. No 6, No 8, No 10, No 12, No 14 and No 16.
10. (Withdrawn) A recombinant vector containing the *crt* gene of claim 8.
11. (Withdrawn) The recombinant vector as set forth in claim e 10, wherein the vector is pCR-XL-TOPO-crtfull having a cleavage map represented in FIG. 16.
12. (Withdrawn) An *E. coli* transformant transformed with the recombinant vector of claim 11.
13. (Withdrawn) A method for producing carotenoid comprising the following steps:
- 1) Cloning the *crt* gene of claim 8;
  - 2) Constructing a recombinant vector in which the *crt* gene of the above step 1) was inserted;
  - 3) Transfecting a host cell with the recombinant vector of the step 2); and
  - 4) Recovering carotenoids from the culture cells in which a strain transformed with the above recombinant vector was being cultured.
14. (Withdrawn) The method as set forth in claim 13, wherein the recombinant vector is that of claim 11.
15. (Withdrawn) The method as set forth in claim 13, wherein the host cell is *E. coli* or yeast.

16. (Withdrawn) The method as set forth in claim 13, wherein the recovery of carotenoids is performed from the culture cells in which the *E. coli* was being cultured.

17. (Withdrawn) The method as set forth in claim 13, wherein the cartenoid is  $\beta$ -carotene or astaxanthine.

18. (Currently Amended) ~~A~~An isolated *Paracoccus haeundaensis* producing astaxanthin, ~~astaxanthine~~, which has comprising a 16S rDNA nuclcotide sequence of SEQ ID NO: 3 ~~represented by SEQ. ID. No 3.~~

19. (Currently Amended) The *Paracoccus haeundaensis* ~~as set forth in~~ of claim 18, ~~wherein the strain which is designated as Accession No. represented by accession No.:~~ KCCM-10460.